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7632 Slate Ridge Boulevard  
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EXAMINER
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BINDA, GREGORY JOHN

ART UNIT	PAPER NUMBER
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3679

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/038,946

Applicant(s)

BURKETT, JERALD S.

Examiner

Greg Binda

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on 02 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/3/02 & 10/02/03 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

*Response to Amendment*

2. The amendment filed Oct 2, 2003 (hereinafter "Amd A") is objected to because it includes changes to paragraph 24 which are not marked. All the text from page 8, lines 13-23 has been deleted in the amendment. Such deletion is assumed to have been made by accident. For the remainder of this action, it assumed that text is still present in the application.

*Drawings*

3. A replacement drawing of Fig. 5 was received on Oct 2, 2003. This drawing is objected to because it fails to show a distinct layer corresponding to the "adhesion layer 48 between the entire exterior surface of the inner tube member [12] and the composite material [18]" described on page 8, lines 15-17 as originally filed. The lead line for reference numeral 48 does not even point to the interface between the exterior surface of the inner tube member 12 and the composite material 18. (All changes which appear in this replacement drawing are approved and must appear in any further replacement of said drawing.)
4. The drawings (originally filed and otherwise) are objected to because:
  - a. They fail to show the "geodesic isotenoid elliptical shape" recited in claims 8 & 13. Applicant alleges on pages 10 & 11 of Amd A that since the claimed invention has a longitudinal axis and symmetrical ends, then, in accordance with the teachings in the

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*Handbook of Composites*, “the wrapped shape [of the claimed invention] that is generated must be a geodesic isotenoid elliptical shape, such that it in fact is what is shown.”

However, applicant doesn't state where precisely this wrapped shape that “must be a geodesic isotenoid elliptical shape” is shown or where in the *Handbook of Composites* applicant finds support for this allegation. In the handbook, the discussion at 16.3.4.1 is titled “geodesic isotenoid” and Fig. 16.8 is described as showing a geodesic path but it is not clear how any of this relates to a shaft that comprises a geodesic isotenoid elliptical shape. Furthermore, applicant cannot rely upon a non-patent reference for the incorporation of essential matter (i.e. a drawing(s) of the claimed invention showing all the limitations of the claims).

b. The single view appearing on page 2 of 6 is labeled both as Fig. 2 and as Fig. 3. Applicant submits in AMD A, page 9 that there is no reason to correct this objection. However, the examiner reserves the right to determine the completeness and consistency of the drawings (see MPEP 608.02(e)) and will therefore maintain the objection until corrected.

5. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

*Claim Rejections - 35 USC § 112*

6. Claims 8 & 13-16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 8, lines 2 & 3 and claim 13, lines 7-9, recite the limitation, "the composite material defines a geodesic isotenoid elliptical shape derived with reference to the angle of the fibers". However, "a series of [well known] differential equations" are required to make the structure corresponding to this limitation per page 14, line 10. There is no further description of the required equations nor is there any evidence to support the assumption that said equations are "well known". In Amd A on page 12 applicant states that a NASA program is needed to make the claimed invention, but no such program or its equivalent is provided in the disclosure. Therefore undue experimentation would be required of one skilled in the art to make and/or use the claimed invention due to the numerous parameters involved.

7. Claims 8 & 13-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- a. Claim 8, line 2 recites the limitation, "the composite material defines a geodesic isotenoid elliptical shape". Its not clear how the composite material 18 would constitute such a shape given that the drawings merely show composite material 18 as a cover over

the inner tube member 12 and the end pieces 14 & 16. That is, the composite material appears to simply assume the shape of the elements it covers.

b. Claim 8, line 2 and claim 13, lines 7 & 8, recite the limitation, "a geodesic isotenoid elliptical shape". Its not clear what a "geodesic isotenoid elliptical shape" looks like given that no such shape is shown.

*Claim Rejections - 35 USC § 102*

8. Claims 1, 4-7 & 9-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Williams, US 3,553,978 (Williams '978). Fig. 1 shows a shaft 10 for the transmission of torsional loads, the shaft 10 comprising: an elongated inner tube member 22 having opposing open ends; an end piece 12 at an end of the inner tube member 22; a composite material 24 covering the inner tube member 22 and a convexly curved portion (see cylindrical portion 16) of the end piece 12; and a sacrificial layer 25 covering the composite material 24. Torque is transmitted **directly** from the inner tube member 12 via "its end portions" (see col. 2, lines 20 & 21) to the end piece 12 via recess 20. Torque is transmitted **indirectly** (i.e. through composite material 22) from the inner tube member 22 via its "outer surfaces" (see col. 2, line 22) to the end piece 12 via its outer surface 18. The composite material 24 is disclosed as including elongated fibers (see "longitudinally extending . . . woven glass fibers" in col. 2, lines 48 & 49) which transfer shear loads longitudinally. The "helically woven glass fibers" disclosed in col. 2, line 49 are oriented at approximately 90 degrees relative to the elongated inner tube member 22.

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9. Claims 1, 4-7 & 9-12 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Williams, US 3,592,884 (Williams '884).

10. Claims 1-7 & 9-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Kreft, US 3,850,722. Fig. 2a shows a shaft for the transmission of torsional loads (see also abstract lines 1 & 2), the shaft comprising: an elongated inner tube member 5 having opposed open ends; at least one end piece 3; a composite material (see "a synthetic fiber . . . wound over" in col. 4, lines 14-16) covering the inner tube member 5 and a convexly curved portion (see Fig. 1 and "dished outer contour" in col. 4, line 18) of the end piece 3. Torque is transmitted **directly** from the inner tube member 5 to the end piece 3 via the clamping ring 2. Torque is transmitted **indirectly** (i.e. through composite material) from the inner tube member 5 to the end piece 3 (see col. 4, lines 28-32). Fig. 3 shows an additional sacrificial layer 6b of fibers oriented 90 degrees relative to the inner tube 5. The angle of twist at failure of the inner tube member 5 and the composite material are the same because they both comprise the same materials of construction.

With regard to claim 3, as argued by applicant in Amd A, in Fig. 2b Kreft shows all the fibers 6 oriented at a single angle. All other limitations in claim 3 are met by Kreft because use of the shaft could be limited to speeds below the first natural frequency of the shaft and to operating loads below maximum operating strength.

11. Claims 1-4, 7-10, 13 & 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Underwood, US 3,366,522. Fig. 4 shows a shaft comprising: an elongated inner tube member 4 having opposed open ends (see Fig. 1 and "building mandrel" at col. 1, line 62 and col. 4, line

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71); at least one end piece 38; and a composite material (see "layers of polyurethane" in col. 3,, line 66) covering the inner tube member 4 and a convexly curved portion 41 of the end piece 38. The angle of twist at failure of the inner tube member 4 and the composite material are the same because they both comprise the same materials of construction. In Fig. 1 Underwood shows elongated fibers being wound around the mandrel in the same manner shown in instant Fig. 4a. So Fig. 1 of Underwood shows (to the same extent shown by applicant) all fibers oriented at the same angle and a geodesic isotenoid elliptical shape. All other limitations in claim 3 are met by Underwood because use of the shaft could be limited to speeds below the first natural frequency of the shaft and to operating loads below maximum operating strength

#### *Response to Arguments*

12. Applicant's arguments filed in Amd A have been fully considered but they are not persuasive.

- a. With regard to item 6, applicant argues the *Handbook of Composites* shows that the equations are well known to those in the art. However, applicant does not identify where in the handbook the equations appear or why their presence in said handbook proves they are well known in the art of shafts.
- b. Applicant relies upon the *Handbook of Composites* for overcoming 112(1) enablement rejection in item 6. However, the teaching in the handbook is related to pressure vessels (see article 16.3.4 in the handbook). As such it is non-analogous art (see applicant's arguments in the second full paragraph on page 14 of Amd A) and cannot be



relied upon to show what would or would not be well known to one skilled in the art of shafts.

c. With regard to item 6, applicant argues that a commercially available NASA program is used to make the claimed invention and so therefore undue experimentation is not required. Perhaps undue experimentation would not be required of one holding said NASA program, but there is no reason to believe that one skilled in the art would necessarily be in possession of such a program since no such program or its equivalent is provided in the disclosure. Furthermore, applicant cannot rely on a non-patent reference for the incorporation of essential subject matter.

d. With regard to item 7, applicant refers back to arguments refuting the drawing objection and 112 rejection. However, those arguments are unpersuasive as noted in subparagraphs a & b and item 4a above.

e. With regard items 8 & 9, applicant argues that the shafts disclosed in Williams '978 and '884 cannot carry torsional load. However, in col. 1, lines 30-34, Williams '978 clearly discloses that the shaft is capable of carrying torsional load (see col. 1, lines 25-30 in '884).

f. With regard to item 10, applicant argues that Kreft fails to show an elongated inner tube member having opposed open ends because core 5 is "solid". However, cutaway view Fig. 2A clearly shows core 5 is in the shape of a hollow tube.

g. With regard to item 11, applicant argues that Underwood does not disclose a shaft because the invention is expressly disclosed as a pressure vessel. However, it is not clear why this is an issue given that the teaching applicant relies upon to teach essential subject

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matter never mentions a shaft, but does mention a pressure vessel. See item 16.3.4 in *Handbook of Composites*.

h. With regard to item 11, applicant argues that the device shown by Underwood cannot transmit torque because it is disclosed as a pressure vessel. However, it is not clear why a pressure vessel would necessarily be unable to transmit torque.

### *Conclusion*

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Greg Binda whose telephone number is (703) 305-2869. The examiner can normally be reached Monday through Thursday from 9:30 am to 7:00 pm. The

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examiner can also be reached on alternate Fridays. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Browne, can be reached on (703) 308-1159. The fax phone number is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2168 and 308-1113.



Greg Binda  
Primary Examiner  
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